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Madrone Leaf Spot and Canker Diseases (Report No. 84-27)

Forest Supervisor, Plumas National Forest

On May 22, 1984, FPM pathologist Detlev Vogler met with Ron O'Hanlon and Mike Heath of the La Porte Ranger District to evaluate foliage diseases of Pacific madrone. They visited several sites on the District where madrone leaves were severely infected; in all cases, the causal fungus was Rhytisma arbuti, which causes a disease called speckled tar spot. Although the disease may appear devastating in the spring, the fungus is usually found only on overwintered foliage. Once the new leaves develop, the infected leaves turn brown and are eventually cast. Infection of the current year's leaves occurs in the fall and winter, and the disease cycle is repeated. Generally, the disease is most damaging during years of above-normal rainfall, but overall its effects are slight. It is very unlikely that this fungus will sufficiently affect madrone to reduce its competition with conifers in plantations.

Speckled tar spot is one of several diseases that afflict madrone, but others are also common in the stands we examined. The enclosed fact sheet describes several of these diseases, and may prove useful in discussing them with the general public. If you have further questions, please contact Detlev Vogler at (415) 556-6864.

/S/

WILFRED L. FREEMAN, JR.
Director of Forest Pest Management

Enclosure

CC:
Phil McDonald, PSW Redding
Ron O'Hanlon, LaPorte

DVogler/crg

COMMON MADRONE DISEASES

Over the past several years, both foresters and the public have reported extensive decline and dieback of Pacific madrone (Arbutus menziesii) throughout northern California. Concern about the use of pesticides has prompted some to wonder whether herbicides are responsible for the damage. The symptoms are not new, however. Plant pathologists have observed them periodically since at least the mid-1940's, and have identified several fungi that are responsible for the symptoms.

Some fungi attack the leaves during the fall and winter, causing them to change color, shrivel, and fall from the trees; these fungi appear to be more common during years of abundant rainfall, but are seldom fatal to their hosts. Other fungi attack the twigs, branches, and stems, causing cankers -- zones of dead tissue separated by a distinct margin from surrounding live tissue -- that can kill portions or all of the crown; their attacks are usually more serious than those of the leaf fungi, but why they are more severe in certain years is unknown. Following are descriptions of some of the more common leaf and canker fungi and of the diseases they cause.

LEAF SPOTS

The leaf disease reported most frequently in 1984 was speckled tar spot, caused by Rhytisma arbuti. The upper side of the leaf develops irregular brown-to-gray patches scattered over the surface and on the margins. The shiny, black fruiting bodies of the fungus are visible without a hand lens on the underside of the leaf; as the name implies, they look like blotches of tar that cannot be rubbed off. Some consider this fungus to be the most damaging of the madrone leaf fungi. It is especially noticeable in the spring before the leaf buds burst; after the new leaves open and expand, however, the disease becomes less obvious. The diseased leaves are often shed shortly after new leaves develop, and the disease appears to have little effect on growth. Occasionally, repeated infections over several years cause extensive defoliation, and may predispose trees to attack by insects and other diseases.

Another common leaf fungus is Mycosphaerella arbuticola. This fungus causes numerous, small (about 1 mm diameter), discrete, white-to-gray spots on the upper leaf surface that are surrounded by a deep red-to-purple margin. The fruiting bodies develop within the necrotic spot, but are difficult to see without a hand lens. Like speckled tar spot, this disease can cause extensive defoliation, but is seldom serious.

Cryptostictus arbuti causes large (several centimeters in diameter), irregular brown spots with a purplish-black border on the upper leaf surface. Occasionally the spots fall out in angular pieces. The small black fruiting bodies are just visible with the naked eye. The effects of this fungus are similar to those of the previous two.

CANKERS

The leaf spot fungi are the most obvious diseases of madrone, particularly in the spring. The canker diseases, though sometimes less apparent, can be far more severe, but little is known about the conditions that favor their development. The fungi that cause canker diseases are usually considered weak parasites, infecting trees through exposed, wounded, or stressed tissues. The current abundance of these diseases may be related to several years of above-normal rainfall, and perhaps to other climatic or unknown events.

Madrone canker associated with a Fusicoccum sp. fungus is common throughout northern California. In its early stages, the disease causes twigs and small branches to discolor, blacken, and die. Occasionally the canker continues to spread into larger, main branches, eventually girdling and killing them. The canker margins are generally smooth and elongate, sometimes extending up to several feet along a branch; the dead bark within the canker has a dark, wine-red color.

Hendersonula canker, caused by the fungus Hendersonula toruloidea, is markedly different from the previous disease. It produces irregular cankers that have numerous partly-healed, swollen-lipped lesions. The fungus attacks weakened or stressed trees through wounds or through tissue damaged by winter injury or sunscald.

The fungus Phytophthora cactorum causes a basal canker of madrone and dogwood. The first symptom is upper crown decline, characterized by small, sparse leaves that turn brown and die. Crown dieback is followed shortly by death of the larger branches and stem. Cankers may be found at the bases of trees near the ground line, where the lesions appear as sunken areas that often exude a black liquid. A definite margin or sometimes a crack surrounds the canker.

CONTROL

In the forest, control of these madrone diseases is generally not economical, and damage is seldom severe enough to warrant treatment. Homeowners may want to prune cankered limbs from valuable specimen trees, or consider fungicide sprays to protect foliage when it is susceptible to infection. Private landowners should consult with the local California Department of Forestry Service Forester or their County Agricultural Commissioner for recommended treatments.